Claims

1. A method for optical data transmission wherein at least a first binary signal (A, B) is converted into a first optical signal (QPS1) and at least a second binary signal (D, C) is converted into a second optical signal (QPS2) polarized orthogonally thereto, wherein the two orthogonally polarized optical signals (QPS1, QPS2) are combined into a polarization multiplex signal (PMS) and then transmitted, wherein the polarization multiplex signal (PMS) is divided at the receiving end into two orthogonally polarized signal parts (PS1, PS2), wherein each polarized signal part (PS1; PS2) is converted in a linear manner into a complex signal ($I_1 + jQ_1$; $I_2 + jQ_2$), wherein the complex signals ($I_1 + jQ_1$; $I_2 + jQ_2$) are routed to a multidimensional filter (16) whose coefficients (C_{ii}) are controlled in such a way that signals ($I_{11} + jQ_{11}$; $I_{12} + jQ_{12}$) which have been reconstructed independently of the polarization of the received polarization multiplex signal (PMS) and which correspond to the optical signals (QPS1, QPS2) are fed out at the filter outputs, and wherein the reconstructed signals ($I_{11} + jQ_{11}$; $I_{21} + jQ_{21}$) are demodulated and converted into binary signals (A_E, B_E; C_E, D_E) at the receiving end.

2. Method according to Claim 1 characterized in that each polarized signal part (PS1; PS2) is converted linearly into a complex electrical signal ($I_1 + jQ_1$; $I_2 + jQ_2$) having two orthogonal components (I_1, Q_1; I_2, Q_2), and in that its orthogonal components (I_1, Q_1; I_2, Q_2) are routed to the controllable multidimensional filter (16) which, from said orthogonal components (I_1, Q_1; I_2, Q_2), obtains the reconstructed signals ($I_{11} + jQ_{11}$; $I_{12} + jQ_{12}$) in the form of reconstructed signal components (I_{11}, Q_{11}; I_{21}, Q_{21}).

3. Method according to Claim 2
characterized in that
the polarized signal parts (PS1, PS2) are converted into the complex signals ($I_1 + jQ_1$; $I_2 + jQ_2$) or, as the case may be, the orthogonal components (I_1, Q_1; I_2 Q_2) of the baseband.

4. Method according to Claim 1 or 2
characterized in that
the binary signals (A, B; C, D) are converted into optical multi-phase signals (QPS1; QPS2).

5. Method according to Claim 1 or 2
characterized in that
in each case two binary signals (A, B; C, D) are converted by means of four-stage differential phase modulation into multiphase signals (QPS1; QPS2).

6. Method according to Claim 4 or 5
characterized in that
with the application of four-phase modulation or four-stage differential phase modulation, demodulated signal components (I_{12}, Q_{12}; I_{22}, Q_{22}) are generated by demodulating the reconstructed signals ($I_{12} + jQ_{12}$; $I_{22} + jQ_{22}$) or their signal components (I_{11}, Q_{11}; I_{12}, Q_{12}), and in that the signal components (I_{12}, Q_{12}; I_{22} Q_{22}) of the demodulated signals ($I_{12} + jQ_{12}$; $I_{22} + jQ_{22}$) are evaluated by threshold comparators and converted into binary signals (A_E, B_E, C_E, D_E) at the receiving end.

7. Method according to Claim 5
characterized in that
with the application of four-stage differential phase modulation, demodulating is carried out by vector-multiplying sequential reconstructed signal values ($I_{11} + jQ_{11}$; $I_{21} + jQ_{21}$) or, as the case may be, their signal components (I_{11}, Q_{11}; I_{21}, Q_{21}),

in that the demodulated signal values ($I_{12} + jQ_{12}$; $I_{22} + jQ_{22}$) are rotated through 45° or a multiple thereof, and in that the associated signal components (I_{12}, Q_{12}; I_{22}, Q_{22}) are converted by threshold comparators into binary signals (A_E, B_E, C_E, D_E) at the receiving end.

8. Method according to one of the preceding Claims characterized in that a data signal (DS) having a higher data rate is converted by means of serial-to-parallel conversion into a multiplicity of binary signals (A, B, C, D).

9. Method according to one of the preceding Claims characterized in that the optical signals (QPS1, QPS2) are transmitted in phase synchronism.

10. Method according to Claim 5 characterized in that the filter coefficients (C_{ii}) of the multidimensional filter (16) are the filter coefficients (C_{ii}) of the multidimensional filter (16) are obtained from errors (e_{I11} and e_{Q11}, ...) of the demodulated signals ($I_{11} + jQ_{11}$, ...).

11. Method according to Claim 5 characterized in that the filter coefficients of the multidimensional filter (16) are obtained from errors (e_{I12} and eQ_{12}, ...) of the decoded signals (I_{12} + jQ_{12} ...).

12. Method according to one of the preceding Claims characterized in that the signal quality is measured and signal distortions in the complex signals and/or reconstructed signals ($I_1 + jQ_1$; $I_2 + jQ_2$; $I_{11} + jQ_{11}$; $I2_1 + jQ_{21}$) are compensated.

13. Method according to one of the preceding Claims characterized in that the signal distortions are compensated by controlling the filter coefficients (C_{ii}) of the filter (16).

14. Method according to one of the preceding Claims characterized in that the orthogonal components (I_1, Q_1; I_2, Q_2) are processed, having been digitized, in a controllable digital filter (D16) to obtain the reconstructed signals ($I_{11} + jQ_{11}$; $I_{21} + jQ_{21}$).

15. Method according to one of the preceding Claims characterized in that the orthogonal components (I_1, Q_1; I_2, Q_2) are processed as optical signals in a controllable optical filter (O16) to obtain optical reconstructed signals ($I_{11} + jQ_{11}$; $I_{21} + jQ_{21}$).